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RESEARCH ON THE POLYMERIZATION OF ALLYLACRYLATE: I. DETERMINATION OF THE STRUCTURE AND MOLECULAR WEIGHT OF THE SOLUBLE FORMS OF POLYALLYLACRYLATE

L. Gindin, S. Medvedev, and Ye. Flesher, Laboratory of Polymerization Processes, Order of Labor Red Banner Physical-Chemical Institute imeni L. Ya. Karpov, Submitted 29 May 1943 *[sic]*

It has been shown by various authors that allylacrylate and similar compounds having two unconnected double bonds form -- both separately and in conjunction with other unsaturated compounds -- special (that is, three-dimensional, reticular) polymers which are insoluble in ordinary solvents. A soluble polymer forms in the earlier stages of the process, but it becomes insoluble later (1-3).

A soluble form of the polymer of allylmethacrylate can be prepared with benzoyl peroxide exposed to ultraviolet light (4). Gindin, Medvedev, and Flesher observed that the polymerization of allylacrylate with benzoyl peroxide in dilute solutions (concentration of the monomer, about 6 percent by weight), in all stages of the process, produced a low-molecular polymer very readily soluble in benzene, chloroform, carbon tetrachloride, acetone, and glacial acetic acid, but not soluble in methanol and ethanol.

The simultaneously present allyl and acryl double bonds could be determined separately because the allyl bonds can be brominated selectively in its bromide-bromate. It was shown that the main chains of the polymeric-allylacrylate were formed predominantly under elimination of the acryl bonds.

During further polymerization, the allyl double bonds, occurring in the side chains of the polymer, take part in initiating the formation of reticular structures and the gel.

The polymerization of allylacrylate is an unusual example of binary copolymerization. The allyl double bond showed little tendency for chain formation.

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